What is claimed is:

1. A bandpass sampling receiver for receiving RF signals, comprising:

a first Sigma-delta ADC, for converting the received RF signal into the first channel of digital signal under the control of the first sampling clock signal;

a second Sigma-delta ADC, for converting the received RF signal into the second channel of digital signal under the control of the second sampling clock signal;

a signal separating unit, for separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal.

2. The receiver of claim 1, wherein the frequency of the first sampling clock signal and the second sampling clock signal is 1/N of that of the RF signal, where N is a natural number.

3. The receiver of claim 2, wherein there exists a relative delay τ between the first sampling clock signal and the second sampling clock signal, and the relative delay τ meets the condition that $\omega_c\tau \neq n\pi$, where ω_c is the circular frequency of the RF signal and n is a natural number.

4. The receiver of claim 3, further comprising:

a first lowpass filter, for receiving the first channel of digital signal and outputting the first channel of digitally filtered baseband digital signal to the signal separating unit;

a second lowpass filter, for receiving the second channel of digital signal and outputting the second channel of digitally filtered baseband digital signal to the signal separating unit.

5. The receiver of claim 4, wherein the signal separatin g unit includes:

an initial phase computing unit, for computing the initial phases of the RF signal relative to the first sampling clock signal and the second sampling clock signal, according to the known signal previously obtained;

an I&Q signal separatin g unit, for separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal, according to the initial phases.

6. The receiver of claim 5, wherein the known signal can be the pilot sig nal or the midamble signal.

7. The receiver of claim 4, further comprising:

the first decimator, for receiving the first channel of baseband digital signal and outputting the first channel of baseband digital signal after decimation to the signal separatin g unit;

the second decimator, for receiving the second channel of baseband digital signal and outputting the second channel of baseband digital signals after decimation to the signal separating unit.

8. The receiver of claim 4, further comprising an RF rec eiving unit, the RF receiving unit including:

a plurality of RF filters, the plurality of RF filters cascade connected with each other, for filtering the received RF signal in turn;

a LNA (low noise amplifier), for amplifying the filtered signal, and supplying the amplified filtered RF signal to the first Sigma -delta ADC and second Sigma-delta ADC.

9. A method to be performed in bandpass sampling receivers, comprising:

(a) converting the received RF signal into the first channel of digital signal in Sigma-delta AD conversion mode, under the control of the first sampling clock signal;

(b) converting the received RF signal into the second channel of digital signal in Sigma-delta AD conversion mode, under the control of the second sampling clock signal;

(c) separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal.

10. The method of claim 9, wherein the frequency of the first sampling clock

signal and the second sampling clock signal is 1/N of that of the RF signal, where N is a natural number.

11. The method of claim 10, wherein there exists a relative delay τ between the first sampling clock signal and the second sampling clock signal and the relative delay τ meets the condition that $\omega_c\tau \neq n\pi$, where ω_c is the circular frequency of the RF signal and n is a natural number.

12. The method of claim 11, further comprising:

filtering the first channel of digital signal and outputting the first channel of filtered baseband dig ital signal;

filtering the second channel of digital signal and outputting the second channel of filtered baseband digital signal;

wherein the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digita l signal are separated in step (c).

13. The method of claim 12, wherein the step (c) includes:

computing the initial phases of the RF signal relative to the first sampling clock signal and the second sampling clock signal, according to the known signal pre viously obtained;

separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal, according to the initial phases.

14. The method of claim 13, wherein the known signal can be the pil ot signal or the midamble signal.

15. A UE (user equipment), comprising:

a transmitter, for transmitting RF signals;

a receiver, for receiving RF signals, the receiver including:

the first Sigma-delta ADC, for converting the received RF signal into the first channel of digital signal under the control of the first sampling clock signal;

the second Sigma-delta ADC, for converting the received RF signal into the second channel of digital signal under the control of the second sampling clock signal;

a signal separating unit, for separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal.

16. The UE of claim 15, wherein the frequency of the first sampling clock signal and the second sampling clock signal is 1/N of that of the RF signal, where N is a natural number.

17. The UE of claim 16, wherein there exists a relative delay τ between the first sampling clock signal and the second sampling clock signal and the relative delay τ meets the condition that $\omega_c\tau \neq n\pi$, where ω_c is the circular frequency of the RF signals and n is a natural number.

18. The UE of claim 17, further comprising:

a first lowpass filter, for receiving the first channel of digital signal and outputting the first channel of digitally filtered baseband digital signal to the signal separating unit;

a second lowpass filter, for receiving the second channel of digital signal and outputting the second channel of digitally filtered baseband digital signal to the signal separating unit.

19. The UE of claim 18, wherein the signal separating unit further includes:

an initial phase computing unit, for computing the initial phases of the RF signal relative to the first sampling clock signal and the second sampling clock signal, according to the known signal previously obtained;

an I&Q signal separating unit, for separating the in-phase signal and the quadrature signal in the first channel of digital signal and the second channel of digital signal, according to the initial phases.

20. The UE of claim 19, wherein the known signal can be the pilot signal or the midamble signal.

21. The UE of claim 18, further comprising:

the first decimator, for receiving the first channel of baseband digital signal and outputting the first channel of baseband digital signal after decimation to the signal separating unit;

the second decimator, for receiving the second channel of baseband digital signal and outputting the second channel of baseband digital signal after decimation to the signal separating unit.

22. The UE of claim 18, further comprising an RF receiving unit, the RF receiving unit including:

a plurality of RF filters, the plurality of RF filters cascade connected with each other, for filtering the received RF signal in turn;

a LNA, for amplifying the filtered signal, and supplying the amplified filtered RF signal to the first Sigma -delta ADC and second Sigma -delta ADC.